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Hail injury to corn and soybean

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Last weekend was certainly an eventful week in terms of weather across the state. Unfortunately, in several of those heavy rainfall areas hail also occurred, adding a whole new dimension to crop injuries. Along with the flooded fields that will reduce plant stands, the damage caused to the plant by hail will also have to be considered when making replant decisions. Corn and soybean differ in their ability to tolerate hail damage and to compensate for reduced stands. For both crops, however, it is essential to make good estimations of plant health and accurate stand counts in order to determine the need for replanting. Overall, it is important to remember that because we are at the beginning of the growing season, hail damage is not as critical as flooded fields.

Corn

At the time of the hail most of the corn had not reached the V5-V6 growth stage yet. This is good news because the growing point is still below ground and even if the leaves have been destroyed or the plant has been cut off, re-growth from the growing point below ground will occur. The loss of those early leaves will reduce growth rate following the damage but will not affect the overall yield significantly. Corn that had reached the V6 or more advanced growth stages may not be viable due to the growing point having moved above ground. At these growth stages, the plant will continue to grow if only the leaves have been knocked off or shredded and the stem has not snapped. When the stems have snapped at the base of the plant, the plant should not be considered viable. Leaves on the plant may have been shredded, but as long as they are connected to the stem they will continue to be an energy source for the plant and plant growth will therefore continue. Defoliation should not be considered a problem until later growth stages, approximately V7 or greater. Because no corn in Iowa is at that stage, leaf loss and stem snapping shouldn't be issues in the state.

Unlike soybean, corn can do little to change its growth pattern to take advantage of increased space in reduced plant populations. A low plant population of corn will mean fewer ears on an area basis, resulting in a yield reduction. Therefore, stand loss is more of a problem in corn, making estimation of viable plants very important. For more information on corn replant decisions see the article Corn replant decisions in this issue.

Soybean

Soybean differs from corn in that as soon as the plant emerges the growing point is above ground and is extremely sensitive to adverse weather events such as hail or frost. In the case of hail, the plant is considered dead if it is in the cotyledon stage and is cut off below the cotyledons, or if it is damaged by hail to such a degree that they have no green leaf tissue or

re-growth. The reason is that nutrients and food reserves in the cotyledons supply the needs of the young plant during emergence and for about seven to 10 days after emergence, or until about the V1 stage (one fully-developed trifoliolate leaf). Cotyledons are the first photosynthetic organs of the soybean seedling and are also major contributors for seedling growth. Unlike corn, whose growing point is below ground until it reaches V5-V6, the growing point for soybean is between the cotyledons and moves above the soil surface at emergence. This makes soybean particularly susceptible to damage from hail, frost, insects like bean leaf beetles, or anything that cuts the plant off below the cotyledons early in its life. Stand reductions are likely to follow hailstorms. After V1, photosynthesis by the developing leaves is adequate for the plant to sustain itself. It is important to remember that defoliation during the vegetative stages will seldom have a large impact on yield. However, it is a whole other story during the reproductive stages. For more information on soybean replant decisions, see the article Soybean replant decisions in this issue.

Secondary problems

Along with the loss of plants in both soybean and corn populations, pathogen problems may also increase and consequently further reduce stands. Plants that have been damaged or wounded also are more susceptible to infection from plant pathogens. Corn is probably not at as much at risk as soybean, and soybean plants that have torn stems should be watched closely in the coming weeks for evidence of pathogen infection. Lesions around the base of the stem and plant wilting are often good indicators. If this is the case, it will be necessary to estimate the number of viable plants in the field again, and make a decision concerning replanting. However, it is difficult to assess this type of injury soon after the hail event. Therefore, if the field has a history of pathogen problems and if temperatures remain cool and wet, loss of wounded plants will probably increase.

Keep in mind that it is still May and problems like loss of plant stand can still be fixed. When it is possible to get back into the fields, take plenty of time to visit each of your fields and make a good estimation of the plant stand where flooding or hail has occurred, based on number of viable plants. Remember that yields will not necessarily be reduced just because plant stand has been reduced.

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